



6721299

09/376,373 GR

FIG. 1

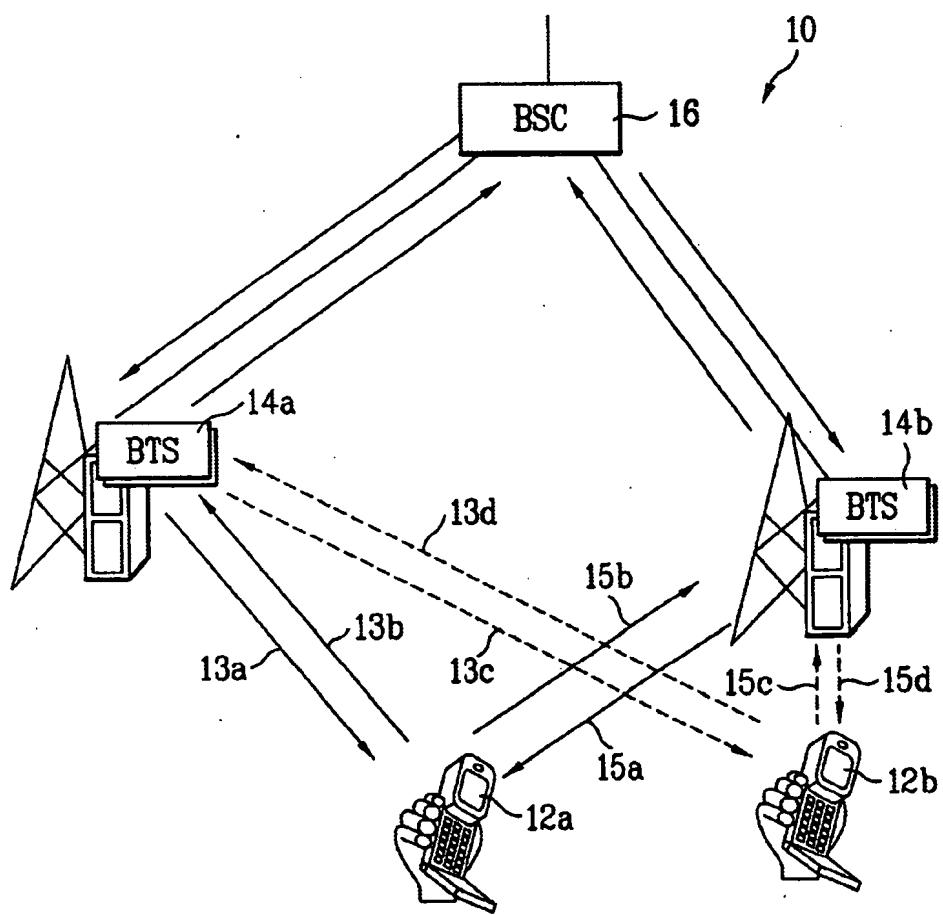




FIG. 2

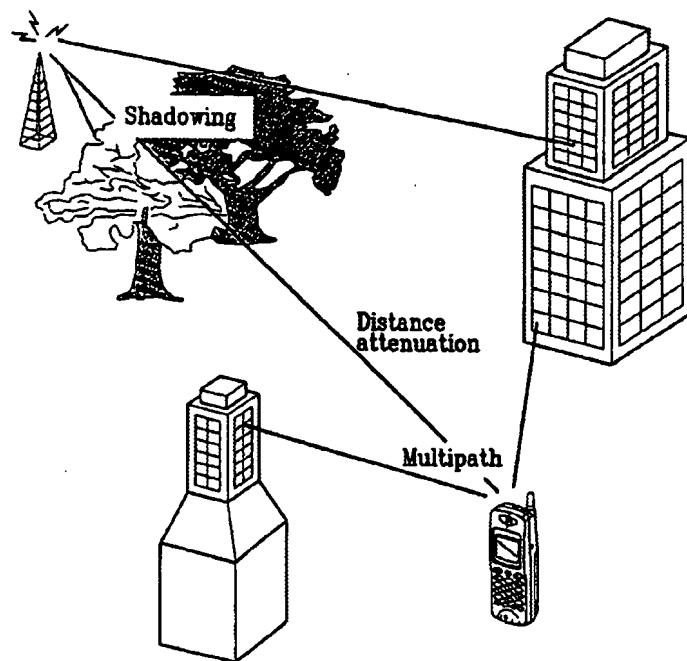
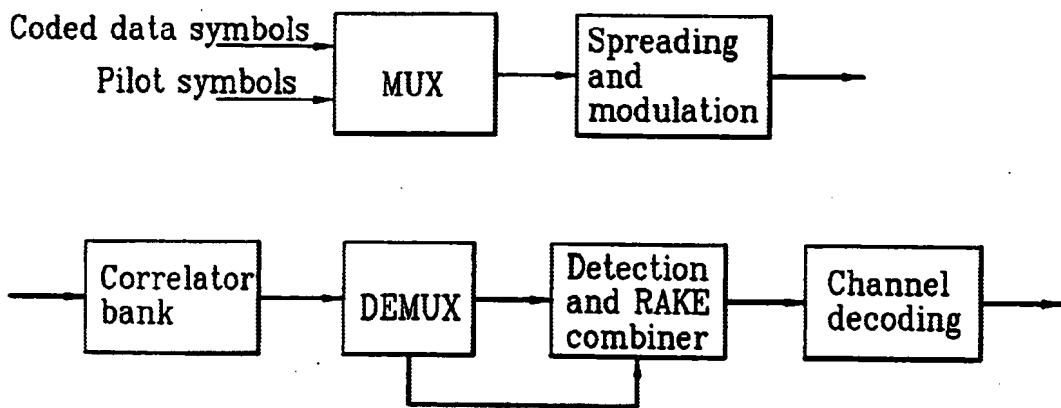
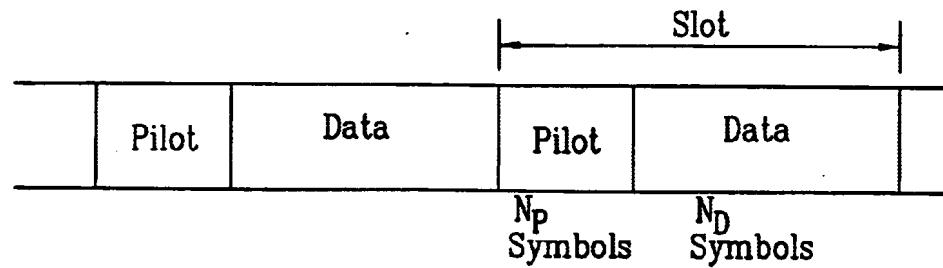


FIG. 3



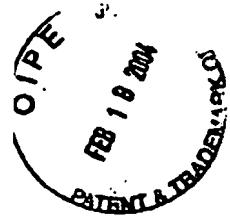


FIG. 4

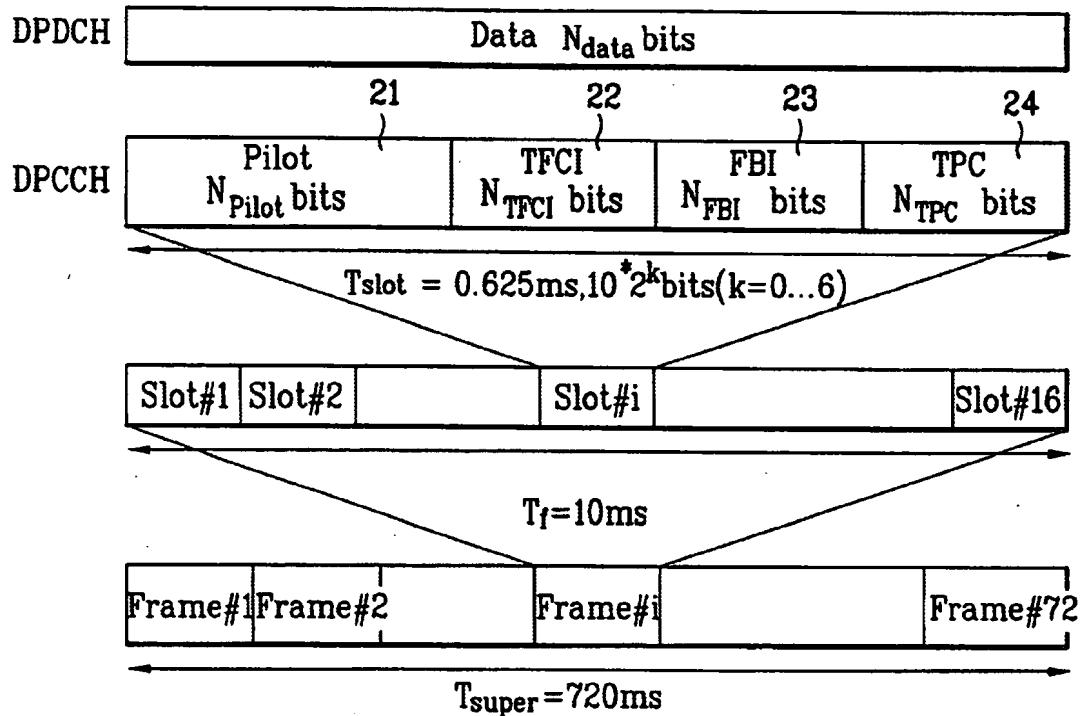


FIG. 5

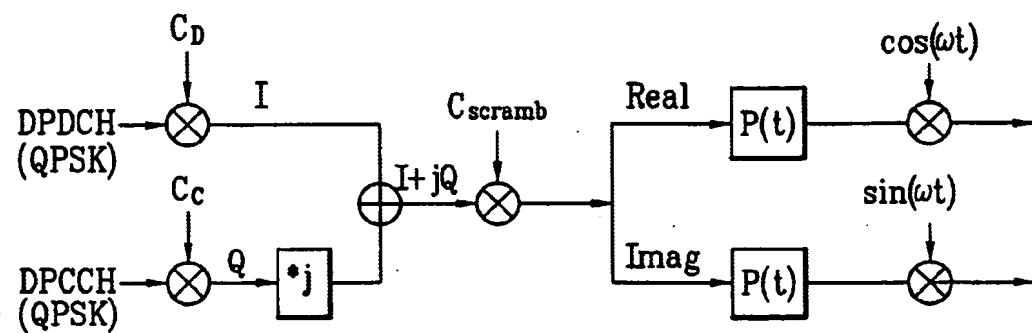
Channel Bit Rate(kbps)	Channel Symbol Rate(ksp/s)	SF	Bits/Frame	Bits/Slot	N_{pilot}	N_{TPC}	N_{TFCI}	N_{FBI}
16	16	256	160	10	6	2	2	0
16	16	256	160	10	8	2	0	0
16	16	256	160	10	5	2	2	1
16	16	256	160	10	7	2	0	1
16	16	256	160	10	[6]	[2]	[0]	[2]
16	16	256	160	10	[5]	[1]	[2]	[2]



FIG. 6

	N _{pilot} =6						N _{pilot} =8							
Bit #	0	1	2	3	4	5	0	1	2	3	4	5	6	7
slot #1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	0	1	1	1	1	1	0	1	1	
3	1	0	1	1	0	1	1	0	1	1	1	0	1	1
4	1	1	0	1	0	1	1	1	1	0	1	0	1	1
5	1	1	0	1	1	1	1	1	1	0	1	1	1	1
6	1	1	0	1	1	1	1	1	1	0	1	1	1	1
7	1	0	1	1	0	0	1	0	1	1	1	0	1	0
8	1	1	0	1	0	1	1	1	1	0	1	0	1	1
9	1	1	1	1	0	0	1	1	1	1	1	0	1	0
10	1	0	1	1	0	1	1	0	1	1	1	0	1	1
11	1	1	1	1	1	0	1	1	1	1	1	1	1	0
12	1	0	1	1	0	1	1	0	1	1	1	0	1	1
13	1	0	0	1	0	1	1	0	1	0	1	0	1	1
14	1	1	0	1	0	0	1	1	1	0	1	0	1	0
15	1	0	1	1	0	0	1	0	1	1	1	0	1	0
16	1	0	0	1	0	0	1	0	1	0	1	0	1	0

FIG. 7



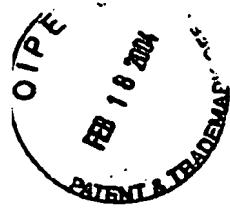


FIG. 8

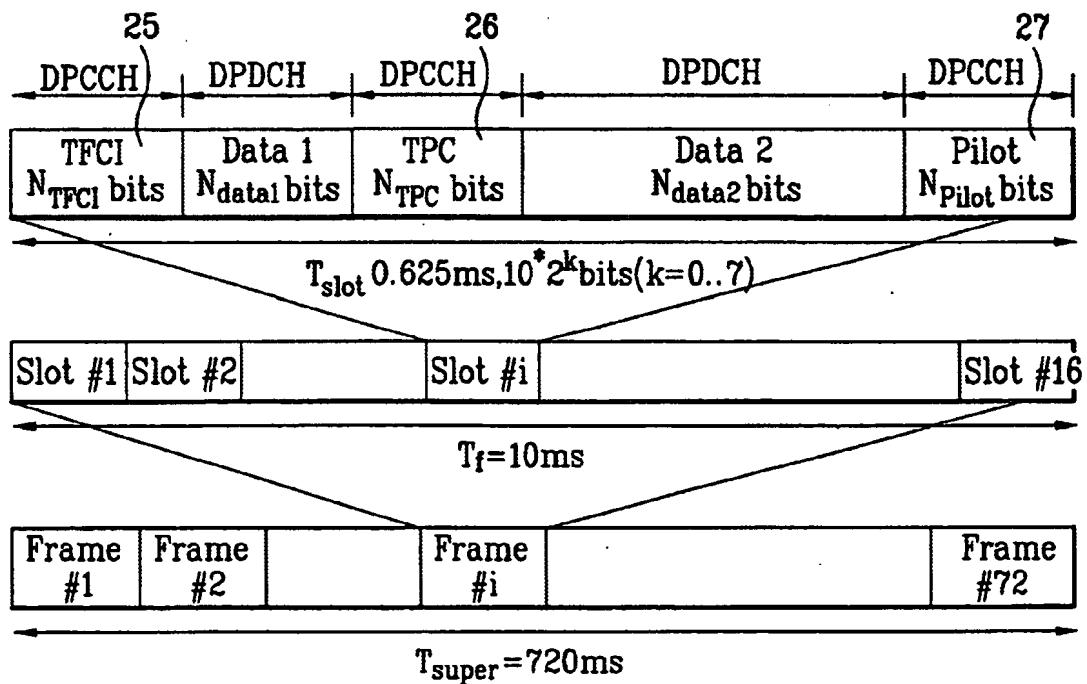
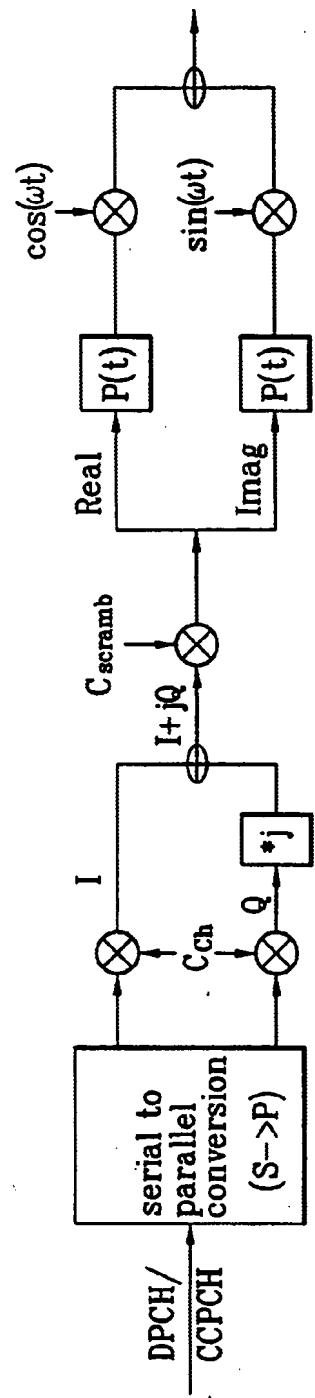


FIG. 9

Symbol rate	8ksps		16,32,64,128ksps				256,512,1024ksps							
	Symbol #	0 1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	11	11	11	11	11	11	11	11	11	11	10
2	11	11	11	11	11	01	11	10	11	10	11	10	11	01
3	11	10	11	01	11	01	11	10	11	01	11	11	11	01
4	11	01	11	10	11	01	11	11	11	01	11	00	11	10
5	11	10	11	10	11	11	11	11	11	00	11	01	11	10
6	11	10	11	10	11	11	11	11	11	11	01	11	11	10
7	11	01	11	01	11	00	11	10	11	11	11	01	11	10
8	11	00	11	10	11	01	11	01	11	00	11	10	11	00
9	11	00	11	11	11	00	11	11	11	10	11	00	11	01
10	11	10	11	01	11	01	11	01	11	11	11	11	11	00
11	11	10	11	11	11	10	11	10	11	10	11	11	11	10
12	11	11	11	01	11	01	11	01	11	10	11	10	11	00
13	11	10	11	00	11	11	01	11	10	11	01	11	11	10
14	11	11	11	10	11	00	11	00	11	10	11	10	11	00
15	11	00	11	01	11	00	11	01	11	10	11	00	11	00
16	11	00	11	00	11	01	11	10	11	00	11	00	11	00



FIG. 10



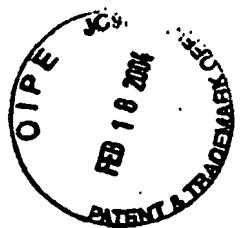


FIG. 11A

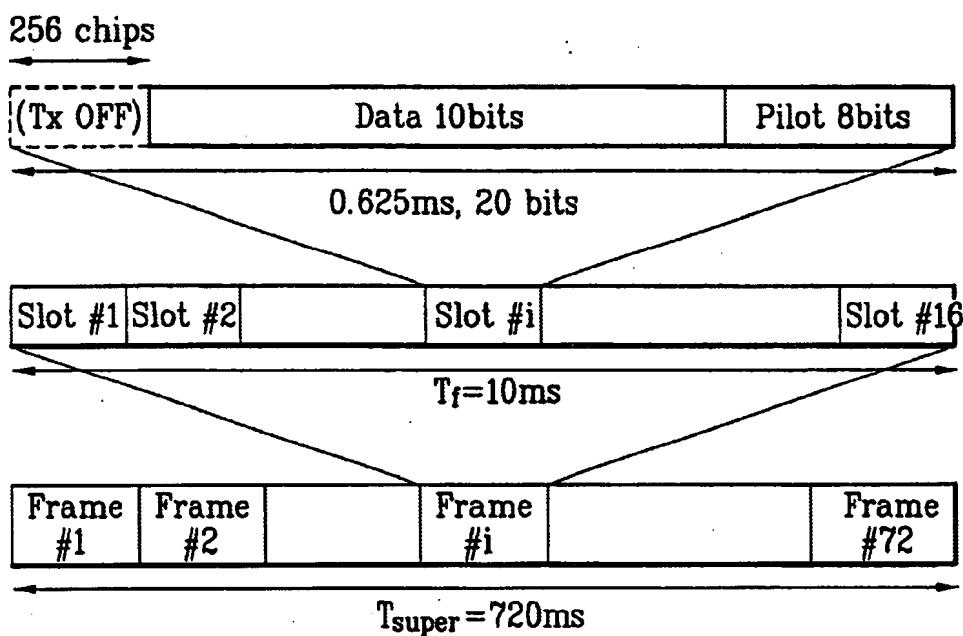
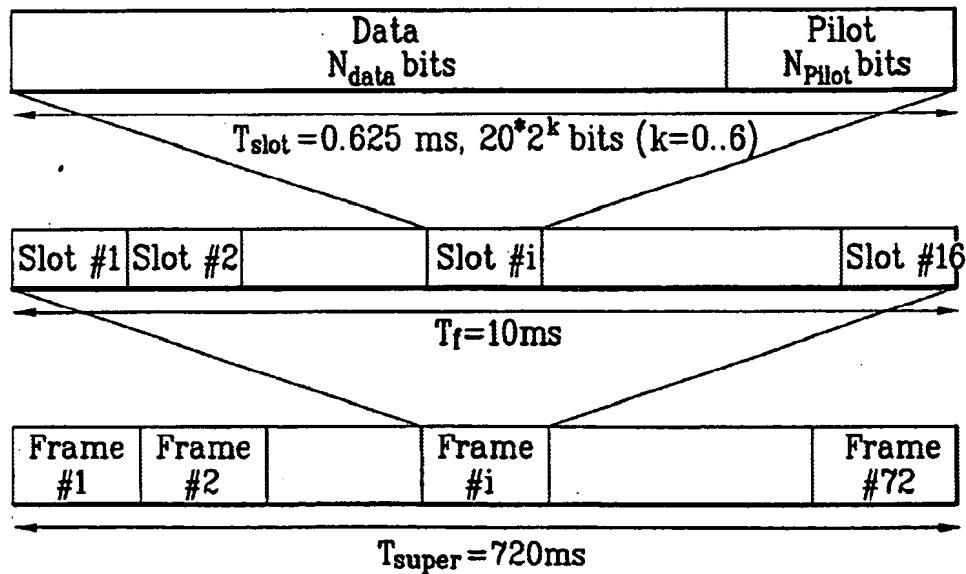


FIG. 11B



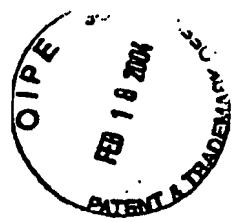


FIG. 12A

Frame Synchronization Words													
Slot Number	1	2	3	4	5	L
$C_1 = (110111100100000)$													
$C_2 = (1000101001110101)$													
$C_3 = (1101110000100011)$													
$C_4 = (0111011010001001)$													
$C_5 = (1011000001001111)$													
$C_6 = (1110010100011010)$													
$C_7 = (0100001110111100)$													
$C_8 = (1110100100010110)$													

FIG. 12B

$R(\tau)$	τ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
$R_E(\tau)$	16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4	
$R_F(\tau)$	16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4	
$R_G(\tau)$	16	4	0	-4	0	4	0	-4	-16	-4	0	4	0	-4	0	4	
$R_H(\tau)$	16	-4	0	4	0	-4	0	4	-16	4	0	-4	0	4	0	-4	

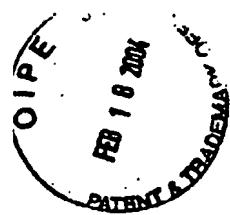


FIG. 13A

$$R_E(\tau) + R_F(\tau), \text{ or } (R_G(\tau) + R_H(\tau))$$

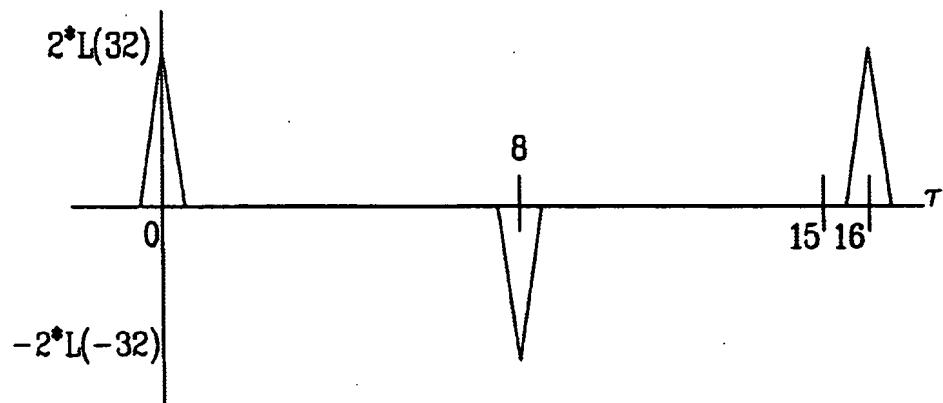


FIG. 13B

$$R_E(\tau) + R_F(\tau), + (R_G(\tau) + R_H(\tau))$$

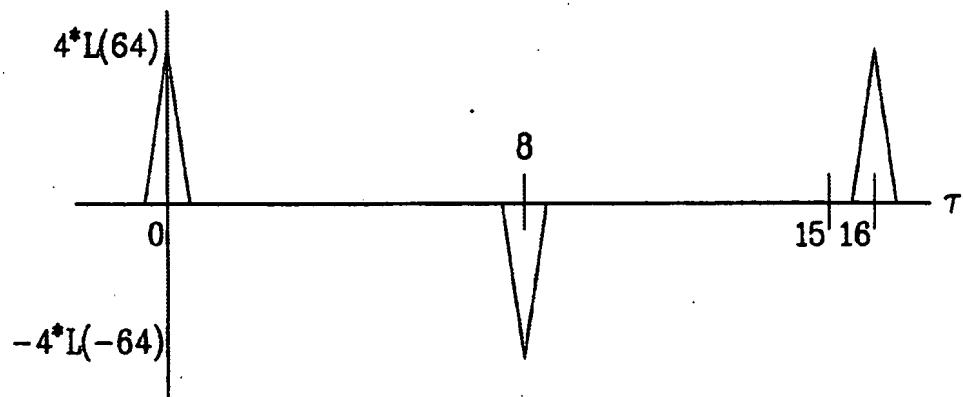




FIG. 14A

Bit #	N _{pilot} = 5					N _{pilot} = 6					
	0	1	2	3	4	0	1	2	3	4	5
Slot #1	1	1	1	1	0	1	1	1	1	1	0
2	1	0	1	1	1	1	1	0	1	1	1
3	0	0	1	0	1	1	0	0	1	0	1
4	1	0	1	1	1	1	1	0	1	1	1
5	1	1	1	1	0	1	1	1	1	1	0
6	1	0	1	1	1	1	1	0	1	1	1
7	1	1	1	0	1	1	1	1	1	0	1
8	1	0	1	0	0	1	1	0	1	0	0
9	0	0	1	0	1	1	0	0	1	0	1
10	0	1	1	0	0	1	0	1	1	0	0
11	1	1	1	1	0	1	1	1	1	1	0
12	0	1	1	0	0	1	0	1	1	0	0
13	0	0	1	0	1	1	0	0	1	0	1
14	0	1	1	0	0	1	0	1	1	0	0
15	0	0	1	1	0	1	0	0	1	1	0
16	0	1	1	1	1	1	0	1	1	1	1



FIG. 14B

	N _{pilot} = 7							N _{pilot} = 8							
Bit #	0	1	2	3	4	5	6	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0
2	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
3	1	0	0	1	0	1	1	1	0	1	0	1	0	1	1
4	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
5	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
6	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
7	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1
8	1	1	0	1	0	0	1	1	1	1	0	1	0	1	0
9	1	0	0	1	0	1	1	1	0	1	0	1	0	1	1
10	1	0	1	1	0	0	1	1	0	1	1	1	0	1	0
11	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
12	1	0	1	1	0	0	1	1	0	1	1	1	0	1	0
13	1	0	0	1	0	1	1	1	0	1	0	1	0	1	1
14	1	0	1	1	0	0	1	1	0	1	1	1	0	1	0
15	1	0	0	1	1	0	1	1	0	1	0	1	1	1	0
16	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1



FIG. 14C

N_{pilot}	Pilot bit position #	Corresponding word of lenght 16
5	0	C_1
	1	C_2
	3	C_3
	4	C_4
6	1	C_1
	2	C_2
	4	C_3
	5	C_4
7	1	C_1
	2	C_2
	4	C_3
	5	C_4
8	1	C_1
	3	C_2
	5	C_3
	7	C_4



FIG. 14D

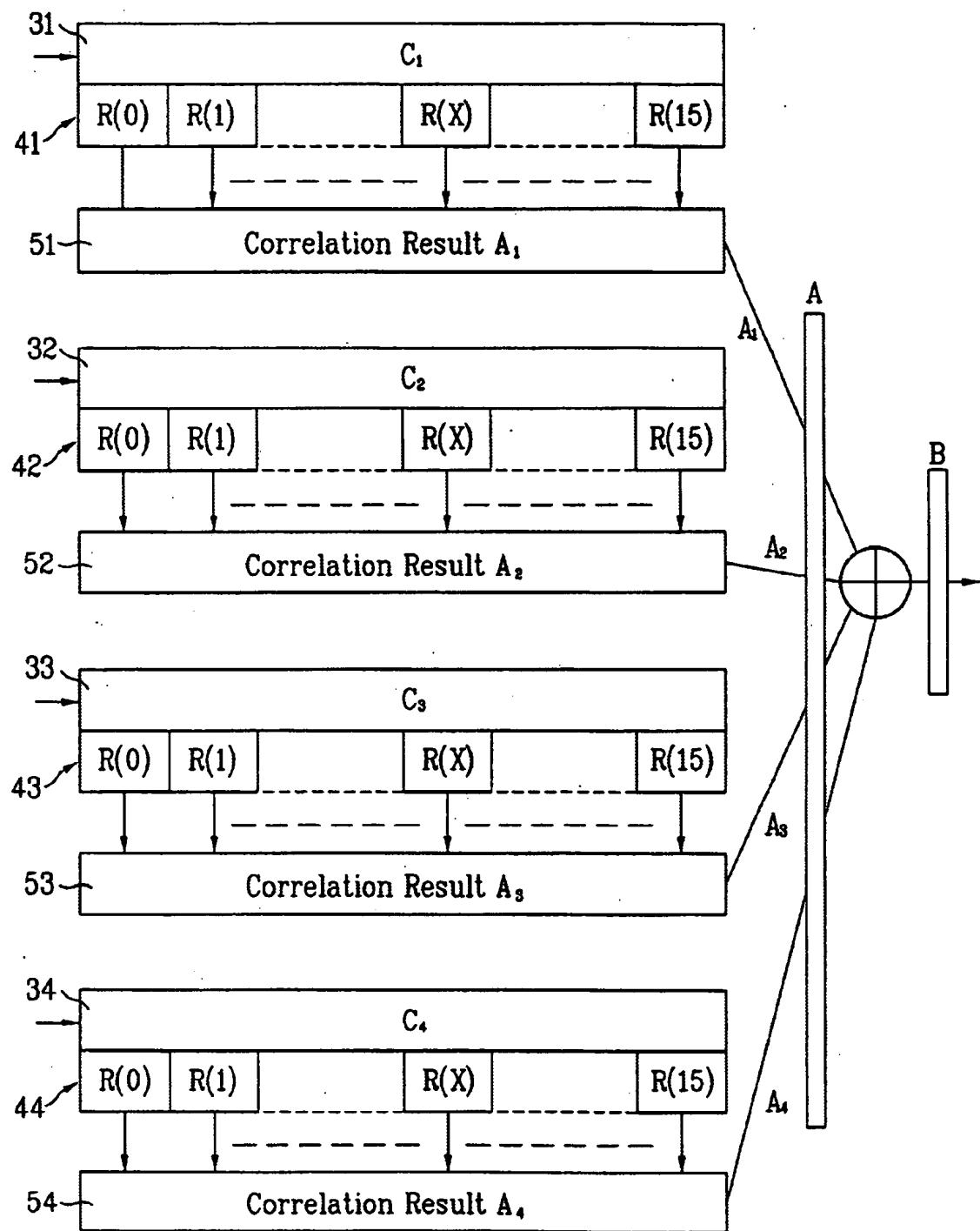




FIG. 14E

	$R_x(0)$	$R_x(1)$	$R_x(2)$	$R_x(3)$	$R_x(4)$	$R_x(5)$	$R_x(6)$	$R_x(7)$	$R_x(8)$	$R_x(9)$	$R_x(10)$	$R_x(11)$	$R_x(12)$	$R_x(13)$	$R_x(14)$	$R_x(15)$
A ₁ POINT	16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4
A ₂ POINT	16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4
A ₃ POINT	16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4
A ₄ POINT	16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4
B POINT	64	0	0	0	0	0	0	0	-64	0	0	0	0	0	0	0

FIG. 14F

	$R_x(0)$	$R_x(1)$	$R_x(2)$	$R_x(3)$	$R_x(4)$	$R_x(5)$	$R_x(6)$	$R_x(7)$	$R_x(8)$	$R_x(9)$	$R_x(10)$	$R_x(11)$	$R_x(12)$	$R_x(13)$	$R_x(14)$	$R_x(15)$
A ₁ POINT + A ₂ POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0
A ₃ POINT + A ₄ POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0
A ₁ POINT + A ₄ POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0
A ₂ POINT + A ₃ POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0



FIG. 14G

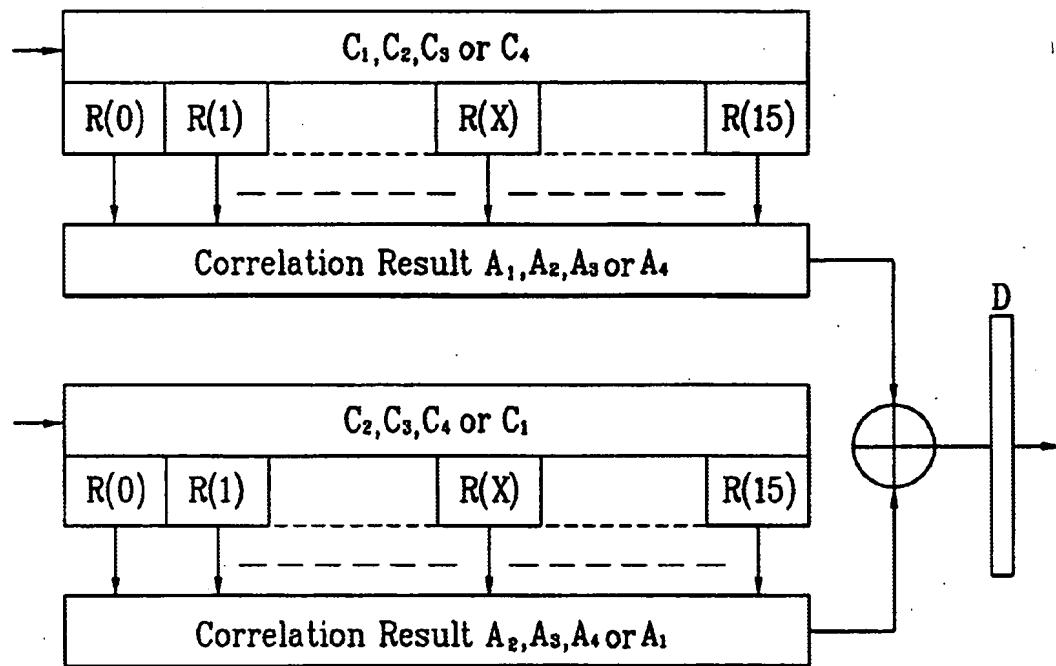


FIG. 14H

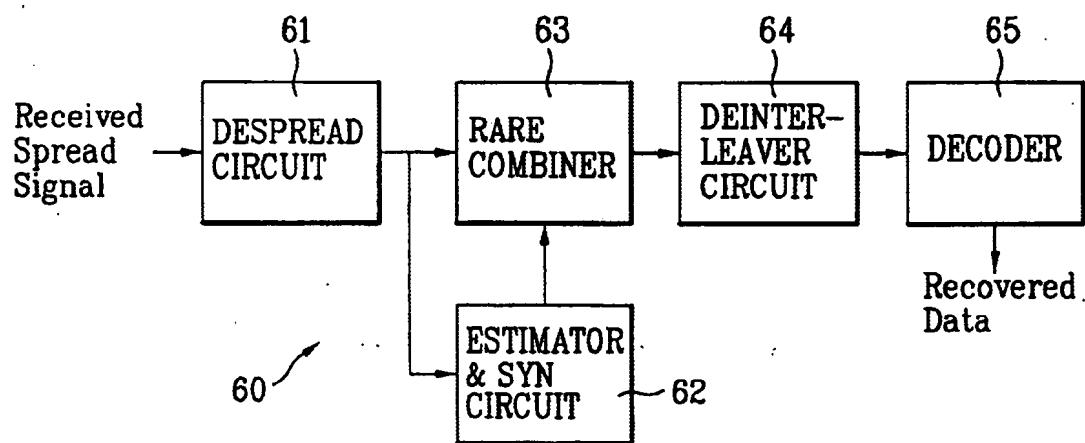




FIG. 14I

	$R_x(0)$	$R_x(1)$	$R_x(2)$	$R_x(3)$	$R_x(4)$	$R_x(5)$	$R_x(6)$	$R_x(7)$	$R_x(8)$	$R_x(9)$	$R_x(10)$	$R_x(11)$	$R_x(12)$	$R_x(13)$	$R_x(14)$	$R_x(15)$
A ₁ POINT	16	-4	-4	8	0	-4	0	0	-4	0	0	-4	0	8	-4	-4
A ₂ POINT	16	0	0	-4	-4	-4	0	0	12	0	0	-4	-4	-4	0	0
A ₃ POINT	16	4	0	0	4	8	8	0	0	0	8	8	4	0	0	4
A ₄ POINT	16	0	4	-4	0	0	-4	4	0	4	-4	0	0	-4	4	0
B POINT	64	0	0	0	0	0	4	4	8	4	4	0	0	0	0	0

FIG. 14J

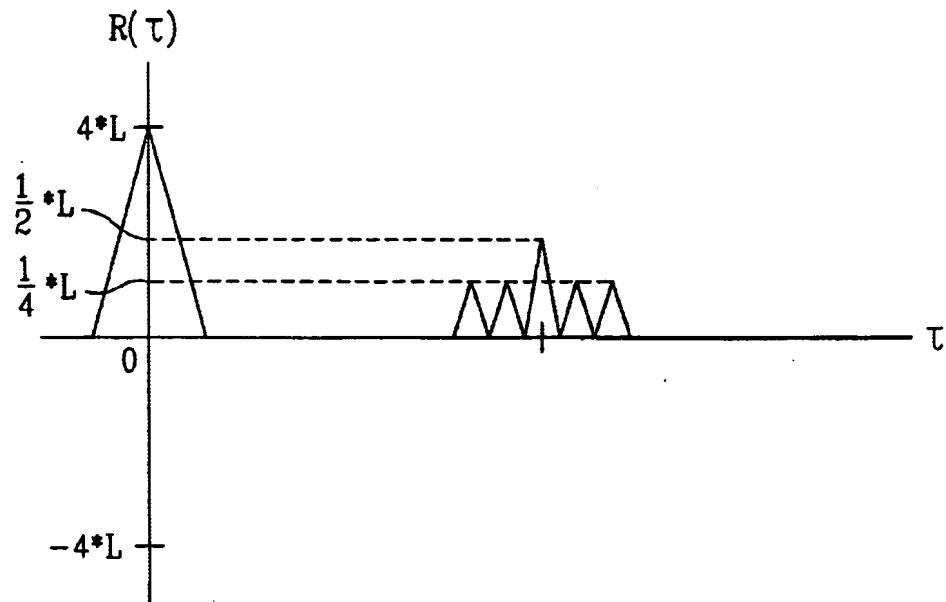




FIG. 15A

Symbol #	N _{pilot} = 4		N _{pilot} = 8				N _{pilot} = 16							
	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	11	11	10	11	11	11	10	11	11	11	01
2	11	10	11	10	11	11	11	10	11	11	11	01	11	11
3	11	00	11	00	11	01	11	00	11	01	11	11	11	01
4	11	10	11	10	11	11	11	10	11	11	11	10	11	00
5	11	11	11	11	11	10	11	11	11	10	11	00	11	01
6	11	10	11	10	11	11	11	10	11	11	11	01	11	00
7	11	11	11	11	11	01	11	11	11	01	11	00	11	10
8	11	10	11	10	11	00	11	10	11	00	11	01	11	11
9	11	00	11	00	11	01	11	00	11	01	11	00	11	10
10	11	01	11	01	11	00	11	01	11	00	11	10	11	00
11	11	11	11	11	11	10	11	11	11	10	11	00	11	10
12	11	01	11	01	11	00	11	01	11	00	11	01	11	11
13	11	00	11	00	11	01	11	00	11	01	11	11	11	10
14	11	01	11	01	11	00	11	01	11	00	11	10	11	11
15	11	00	11	00	11	10	11	00	11	10	11	11	11	01
16	11	01	11	01	11	11	11	01	11	11	11	10	11	00

FIG. 15B

Symbol rate	Symbol #	Channel	Corresponding word of length L=16
N _{pilot} = 4	1	I-CH	C ₁
		Q-CH	C ₂
N _{pilot} = 8	1	I-CH	C ₁
		Q-CH	C ₂
	3	I-CH	C ₃
		Q-CH	C ₄
N _{pilot} = 16	1	I-CH	C ₁
		Q-CH	C ₂
	3	I-CH	C ₃
		Q-CH	C ₄
	5	I-CH	C ₅
		Q-CH	C ₆
	7	I-CH	C ₇
		Q-CH	C ₈



FIG. 15C

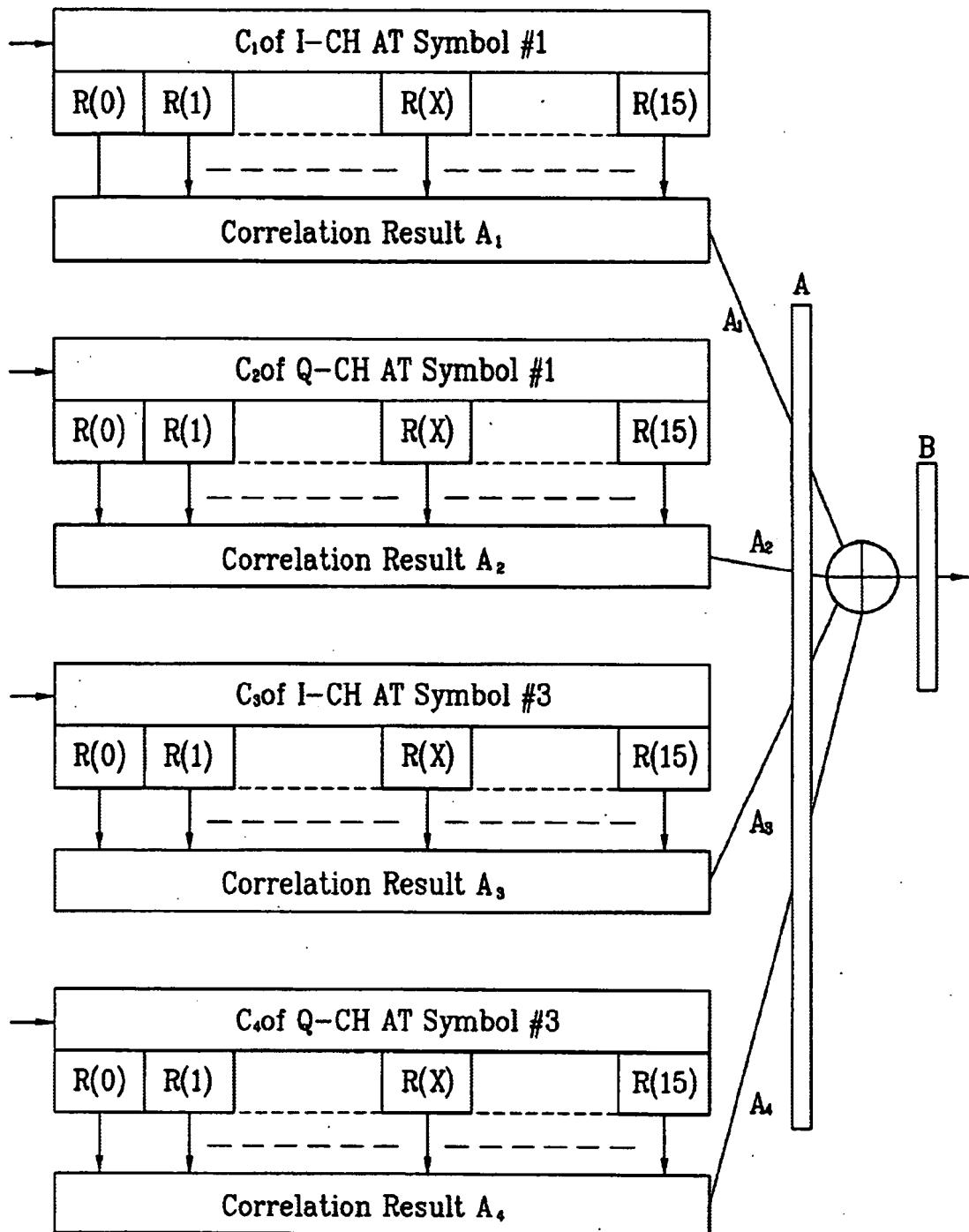




FIG. 16A

Symbol #	0	1	2	3
Slot #1	11	11	11	10
2	11	10	11	11
3	11	00	11	01
4	11	10	11	11
5	11	11	11	10
6	11	10	11	11
7	11	11	11	01
8	11	10	11	00
9	11	00	11	01
10	11	01	11	00
11	11	11	11	10
12	11	01	11	00
13	11	00	11	01
14	11	01	11	00
15	11	00	11	10
16	11	01	11	11

FIG. 16B

Symbol #	Channel	Corresponding word of length 16
1	I-CH	C_1
	Q-CH	C_2
3	I-CH	C_3
	Q-CH	C_4

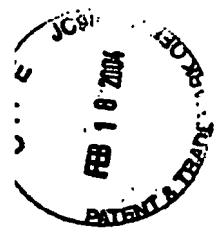


FIG. 16C

Symbol rate	$N_{\text{pilot}} = 8$				$N_{\text{pilot}} = 1$							
Symbol #	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	10	11	11	11	10	11	11	11	01
2	11	10	11	11	11	10	11	11	11	01	11	11
3	11	00	11	01	11	00	11	01	11	11	11	01
4	11	10	11	11	11	10	11	11	11	10	11	00
5	11	11	11	10	11	11	11	10	11	00	11	01
6	11	10	11	11	11	10	11	11	11	01	11	00
7	11	11	11	01	11	11	11	01	11	00	11	10
8	11	10	11	00	11	10	11	00	11	01	11	11
9	11	00	11	01	11	00	11	01	11	00	11	10
10	11	01	11	00	11	01	11	00	11	10	11	00
11	11	11	11	10	11	11	11	10	11	00	11	10
12	11	01	11	00	11	01	11	00	11	01	11	11
13	11	00	11	01	11	00	11	01	11	11	11	10
14	11	01	11	00	11	01	11	00	11	10	11	11
15	11	00	11	10	11	00	11	10	11	11	11	01
16	11	01	11	11	11	01	11	11	11	10	11	00

FIG. 16D

Symbol rate	Symbol #	Channel	Corresponding word of length $L=16$
$N_{\text{pilot}} = 8$	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
$N_{\text{pilot}} = 16$	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
	5	I-CH	C_5
		Q-CH	C_6
	7	I-CH	C_7
		Q-CH	C_8



FIG. 17A

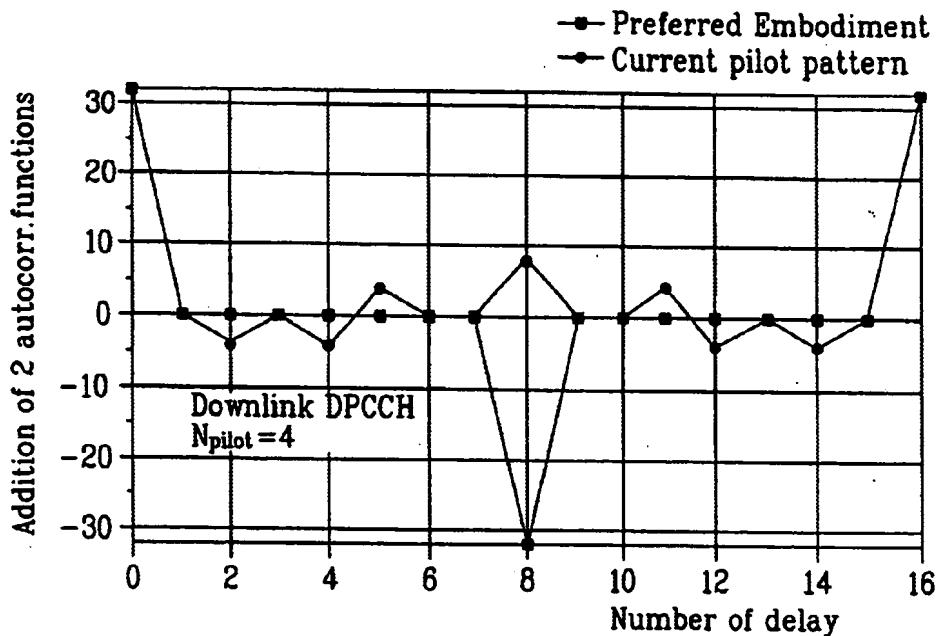


FIG. 17B

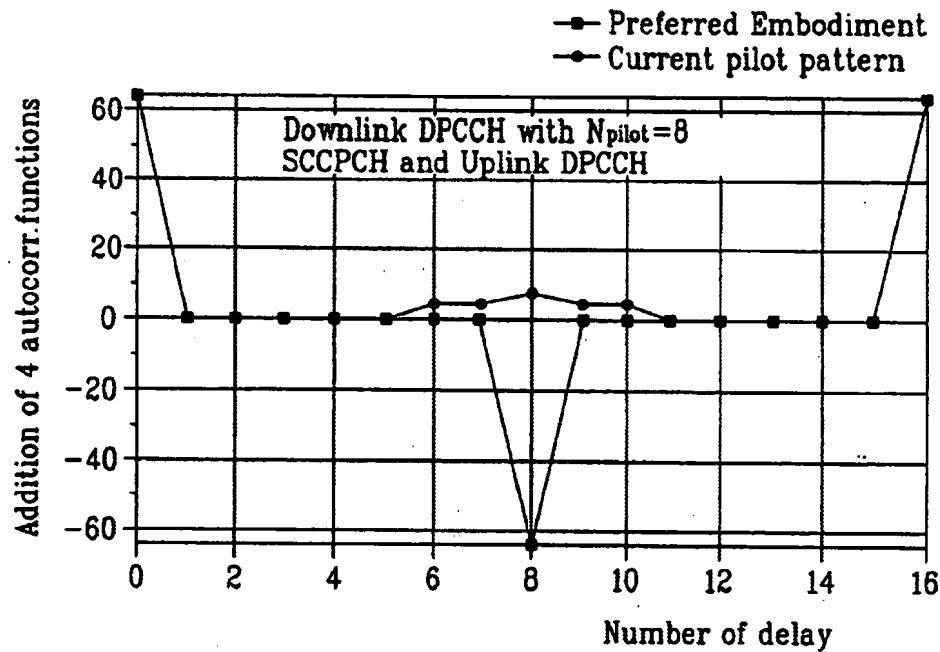




FIG. 17C

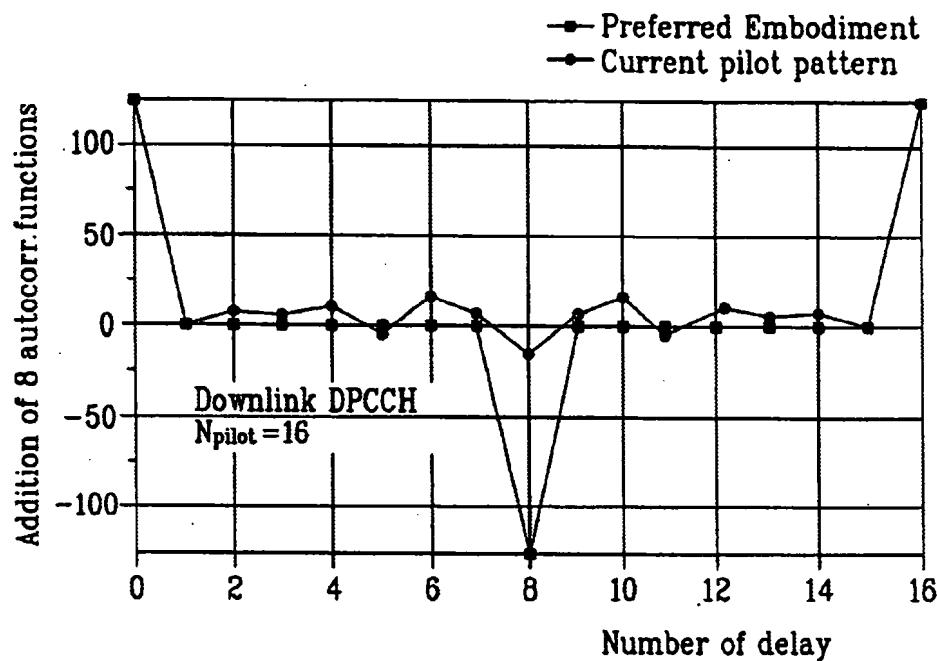


FIG. 18A

Parameters	Downlink
Slot per frame	16
Number of bits in the DPCCH (Pilot/TPC/TFCI)	4/2/0
Number of bits in the DPDCH per each slot	4
Spreding factor (DPDCH)	512
Spreding factor (DPCCH)	512
Modulation	QPSK
3dB bandwidth	4.096MHz
Shaping filter	Root raised cosine (roll off 0.22)
Power amplifier	Ideal
Propogation channel	AWGN



FIG. 18B

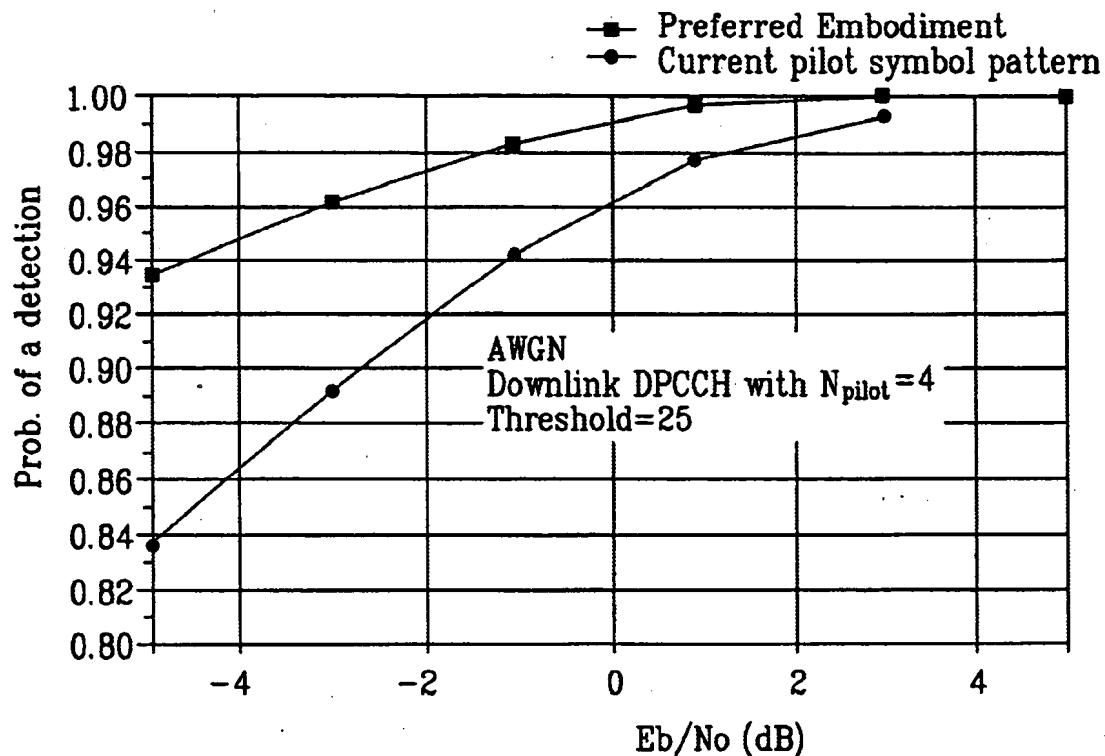


FIG. 18C

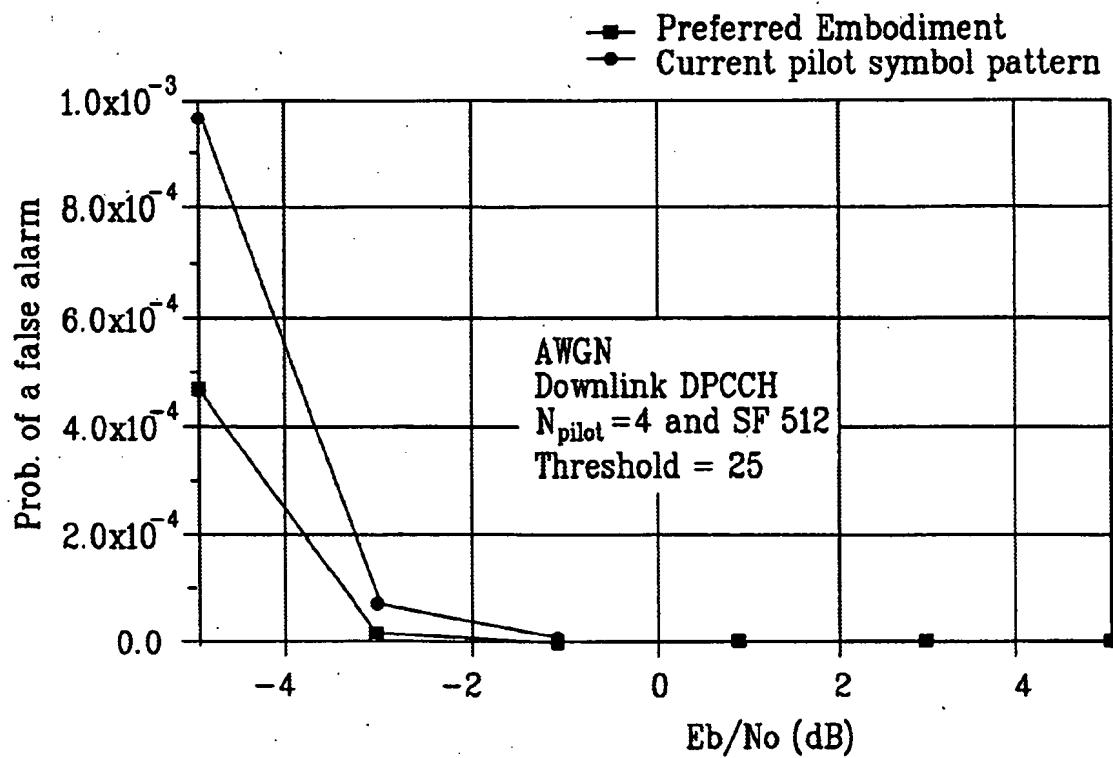
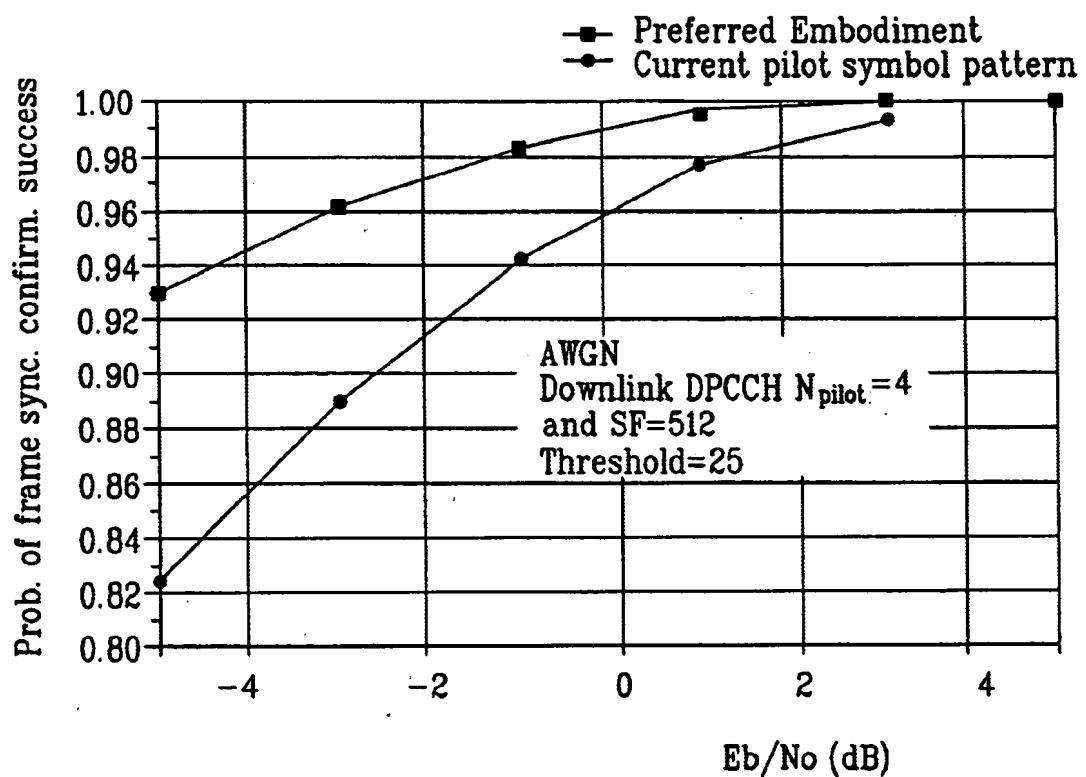




FIG. 18D



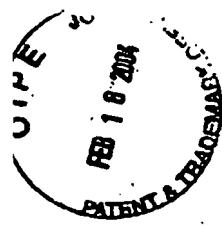


FIG. 19A

	N _{pilot} = 4		N _{pilot} = 8				N _{pilot} = 16							
Symbol #	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	01	10	11	00	00	10	11	00	00	10	11	11	00	10
	2	00	10	11	01	00	11	11	01	00	11	11	01	00
	3	10	10	11	11	00	01	11	11	00	01	11	11	00
	4	00	10	11	01	00	11	11	01	00	11	11	10	00
	5	01	10	11	00	00	10	11	00	00	10	11	11	00
	6	00	10	11	01	00	11	11	01	00	11	11	10	00
	7	01	10	11	11	00	10	11	11	00	10	11	00	01
	8	00	10	11	10	00	11	11	10	00	11	11	01	00
	9	10	10	11	11	00	01	11	11	00	01	11	00	01
	10	11	10	11	10	00	00	11	10	00	00	11	10	00
	11	01	10	11	00	00	10	11	00	00	10	11	00	01
	12	11	10	11	10	00	00	11	10	00	00	11	01	00
	13	10	10	11	11	00	01	11	11	00	01	11	00	10
	14	11	10	11	10	00	00	11	10	00	00	11	01	00
	15	10	10	11	00	00	01	11	00	00	01	11	11	00
	16	11	10	11	01	00	00	11	01	00	00	11	10	00

FIG. 19B

Symbol rate	Symbol #	Channel	Corresponding word of length 16
N _{pilot} = 4	0	I - CH	-C ₁
		Q - CH	C ₂
N _{pilot} = 8	1	I - CH	-C ₃
		Q - CH	C ₄
	3	I - CH	C ₁
		Q - CH	-C ₂
N _{pilot} = 16	1	I - CH	-C ₃
		Q - CH	C ₄
	3	I - CH	C ₁
		Q - CH	-C ₂
	5	I - CH	-C ₇
		Q - CH	C ₈
	7	I - CH	C ₆
		Q - CH	-C ₈

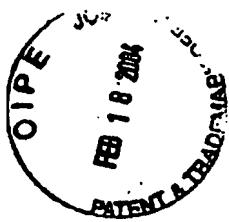


FIG. 19C

Symbol #	0	1	2	3
Slot #1	11	11	00	01
2	11	10	00	00
3	11	00	00	10
4	11	10	00	00
5	11	11	00	01
6	11	10	00	00
7	11	11	00	10
8	11	10	00	11
9	11	00	00	10
10	11	01	00	11
11	11	11	00	01
12	11	01	00	11
13	11	00	00	10
14	11	01	00	11
15	11	00	00	01
16	11	01	00	00

FIG. 19D

Symbol rate	Channel	Corresponding word of length 16
1	I - CH	C_1
	Q - CH	C_2
3	I - CH	$-C_3$
	Q - CH	$-C_4$



FIG. 19E

Symbol #	N _{slot} = 8				N _{slot} = 16							
	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	00	00	10	11	00	00	10	11	11	00	10
	11	01	00	11	11	01	00	11	11	01	00	00
	11	11	00	01	11	11	00	01	11	11	00	10
	11	01	00	11	11	01	00	11	11	10	00	11
	11	00	00	10	11	00	00	10	11	11	00	01
	11	01	00	11	11	01	00	11	11	10	00	00
	11	11	00	10	11	11	00	10	11	00	00	01
	11	10	00	11	11	10	00	11	11	01	00	00
	11	11	00	01	11	11	00	01	11	00	00	01
	11	10	00	00	11	10	00	00	11	10	00	11
	11	00	00	10	11	00	00	10	11	00	00	01
	11	10	00	00	11	10	00	00	11	01	00	00
	11	11	00	01	11	11	00	01	11	00	00	10
	11	10	00	00	11	10	00	00	11	01	00	11
	11	00	00	01	11	00	00	01	11	11	00	10
	11	01	00	00	11	01	00	00	11	10	00	11

FIG. 19F

Symbol rate	Symbol #	Channel	Corresponding word of length 16
N _{slot} = 8	1	I - CH	-C ₃
		Q - CH	C ₄
	3	I - CH	C ₁
		Q - CH	-C ₂
N _{slot} = 16	1	I - CH	-C ₃
		Q - CH	C ₄
	3	I - CH	C ₁
		Q - CH	-C ₂
	5	I - CH	-C ₇
		Q - CH	C ₈
	7	I - CH	C ₆
		Q - CH	-C ₆

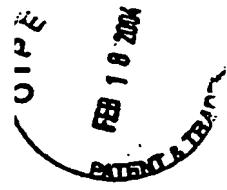


FIG. 20A

Sequence	Autocorrelation
$C_1 = (110111100100000)$	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
$C_2 = (1000101001110101)$	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
$C_3 = (111101100000100)$	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
$C_4 = (0101000110101110)$	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
$C_5 = (00111011110000100)$	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
$C_6 = (0010010111011010)$	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4
$C_7 = (0111000010001111)$	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
$C_8 = (1011101001000101)$	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4
$C_9 = (0011011111001000)$	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
$C_{10} = (0010100111010110)$	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
$C_{11} = (1100000100111110)$	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
$C_{12} = (1011100101000110)$	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
$C_{13} = (0100001110111100)$	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
$C_{14} = (1000100101110110)$	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4
$C_{15} = (0000100011110111)$	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
$C_{16} = (1001000101101110)$	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4

FIG. 20B

$R(\tau)$	τ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
$R_E(\tau)$		16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4
$R_F(\tau)$		16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4
$R_G(\tau)$		16	4	0	-4	0	4	0	-4	-16	-4	0	4	0	-4	0	4
$R_H(\tau)$		16	-4	0	4	0	-4	0	4	-16	4	0	-4	0	4	0	-4



FIG. 20C

Bit #	Npilot = 6						Npilot = 8							
	0	1	2	3	4	5	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
2	1	1	0	1	1	1	1	1	1	0	1	1	1	1
3	1	0	0	1	1	0	1	0	1	0	1	1	1	0
4	1	1	0	1	1	1	1	1	1	0	1	1	1	1
5	1	1	1	1	1	0	1	1	1	1	1	1	1	0
6	1	1	0	1	0	0	1	1	1	0	1	0	1	0
7	1	1	1	1	1	0	1	1	1	1	1	1	1	0
8	1	1	0	1	1	1	1	1	1	0	1	1	1	1
9	1	0	0	1	0	1	1	0	1	0	1	0	1	1
10	1	0	1	1	0	0	1	0	1	1	1	0	1	0
11	1	1	1	1	0	1	1	1	1	1	1	0	1	1
12	1	0	1	1	0	0	1	0	1	1	1	0	1	0
13	1	0	0	1	0	1	1	0	1	0	1	0	1	1
14	1	0	1	1	1	1	1	0	1	1	1	1	1	1
15	1	0	0	1	0	1	1	0	1	0	1	0	1	1
16	1	0	1	1	0	0	1	0	1	1	1	0	1	0

FIG. 20D

Npilot	Pilot bit position #	Corresponding word of length 16
6	1	C ₁
	2	C ₂
	4	C ₃
	5	C ₄
8	1	C ₁
	3	C ₂
	5	C ₃
	7	C ₄



FIG. 20E

Symbol rate	8ksps				16,32,64,128ksps				256,512,1024ksps							
Symbol #	0	1	0	1	2	3	0	1	2	3	4	5	6	7		
Slot #1	11	11	11	11	11	10	11	11	11	10	11	00	11	01		
	11	10	11	10	11	11	11	10	11	11	11	00	11	10		
	11	00	11	00	11	10	11	00	11	10	11	11	11	11		
	11	10	11	10	11	11	11	10	11	11	11	10	11	11		
	11	11	11	11	11	10	11	11	11	10	11	10	11	01		
	11	10	11	10	11	00	11	10	11	00	11	01	11	00		
	11	11	11	11	11	10	11	11	11	10	11	10	11	01		
	11	10	11	10	11	11	11	10	11	11	11	11	11	00		
	11	00	11	00	11	01	11	00	11	01	11	11	11	10		
	11	01	11	01	11	00	11	01	11	00	11	11	11	01		
	11	11	11	11	11	01	11	11	11	01	11	00	11	00		
	11	01	11	01	11	00	11	01	11	00	11	01	11	00		
	11	00	11	00	11	01	11	00	11	01	11	01	11	10		
	11	01	11	01	11	11	11	01	11	11	11	10	11	11		
	11	00	11	00	11	01	11	00	11	01	11	01	11	10		
	11	01	11	01	11	00	11	01	11	00	11	00	11	11		



FIG. 20F

Symbol rate	2048,4096ksps															
Symbol #	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Slot #1	11	11	11	10	11	00	11	01	11	00	11	11	11	01	11	01
2	11	10	11	11	11	00	11	10	11	00	11	10	11	10	11	00
3	11	00	11	10	11	11	11	11	11	11	11	01	11	00	11	00
4	11	10	11	11	11	10	11	11	11	10	11	01	11	00	11	01
5	11	11	11	10	11	10	11	01	11	01	11	01	11	01	11	10
6	11	10	11	00	11	01	11	00	11	10	11	00	11	00	11	00
7	11	11	11	10	11	10	11	01	11	10	11	00	11	10	11	00
8	11	10	11	11	11	11	11	00	11	11	11	11	11	11	11	01
9	11	00	11	01	11	11	11	10	11	11	11	00	11	10	11	10
10	11	01	11	00	11	11	11	01	11	11	11	01	11	01	11	11
11	11	11	11	01	11	00	11	00	11	00	11	10	11	11	11	11
12	11	01	11	00	11	01	11	00	11	01	11	10	11	11	11	10
13	11	00	11	01	11	01	11	10	11	10	11	10	11	10	11	01
14	11	01	11	11	11	10	11	11	01	11	11	11	11	11	11	11
15	11	00	11	01	11	01	11	10	11	01	11	11	11	01	11	11
16	11	01	11	00	11	00	11	11	11	00	11	00	11	00	11	10

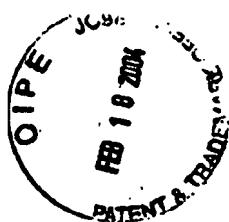


FIG. 20G

Symbol rate	Symbol #	Channel	Corresponding word of length 16
8ksps	1	I - CH	C ₁
		Q - CH	C ₂
16, 32, 64, 128ksps	1	I - CH	C ₁
		Q - CH	C ₂
256, 512, 1024ksps	3	I - CH	C ₃
		Q - CH	C ₄
2048, 4096ksps	1	I - CH	C ₁
		Q - CH	C ₂
256, 512, 1024ksps	3	I - CH	C ₃
		Q - CH	C ₄
256, 512, 1024ksps	5	I - CH	C ₅
		Q - CH	C ₆
256, 512, 1024ksps	7	I - CH	C ₇
		Q - CH	C ₈
2048, 4096ksps	1	I - CH	C ₁
		Q - CH	C ₂
2048, 4096ksps	3	I - CH	C ₃
		Q - CH	C ₄
2048, 4096ksps	5	I - CH	C ₅
		Q - CH	C ₆
2048, 4096ksps	7	I - CH	C ₇
		Q - CH	C ₈
2048, 4096ksps	9	I - CH	C ₉
		Q - CH	C ₁₀
2048, 4096ksps	11	I - CH	C ₁₁
		Q - CH	C ₁₂
2048, 4096ksps	13	I - CH	C ₁₃
		Q - CH	C ₁₄
2048, 4096ksps	15	I - CH	C ₁₅
		Q - CH	C ₁₆



FIG. 20H

Symbol #	0	1	2	3
Slot #1	11	11	11	10
2	11	10	11	11
3	11	00	11	10
4	11	10	11	11
5	11	11	11	10
6	11	10	11	00
7	11	11	11	10
8	11	10	11	11
9	11	00	11	01
10	11	01	11	00
11	11	11	11	01
12	11	01	11	00
13	11	00	11	01
14	11	01	11	11
15	11	00	11	01
16	11	01	11	00

FIG. 20I

Symbol #	Channel	Corresponding word of length 16
1	I-CH	C ₁
	Q-CH	C ₂
3	I-CH	C ₃
	Q-CH	C ₄



FIG. 21

Frame Synchronization Words	
$L=15$, Slot No.	1 2 3 415
C_1 =	(1 0 0 0 1 1 1 1 0 1 0 1 1 0 0)
C_2 =	(1 0 1 0 0 1 1 0 1 1 1 0 0 0 0)
C_3 =	(1 1 0 0 0 1 0 0 1 1 0 1 0 1 1)
C_4 =	(0 0 1 0 1 0 0 0 0 1 1 1 0 1 1)
C_5 =	(1 1 1 0 1 0 1 1 0 0 1 0 0 0 1)
C_6 =	(1 1 0 1 1 1 0 0 0 0 1 0 1 0 0)
C_7 =	(1 0 0 1 1 0 1 0 1 1 1 1 0 0 0)
C_8 =	(0 0 0 0 1 1 1 0 1 1 0 0 1 0 1)

FIG. 22A

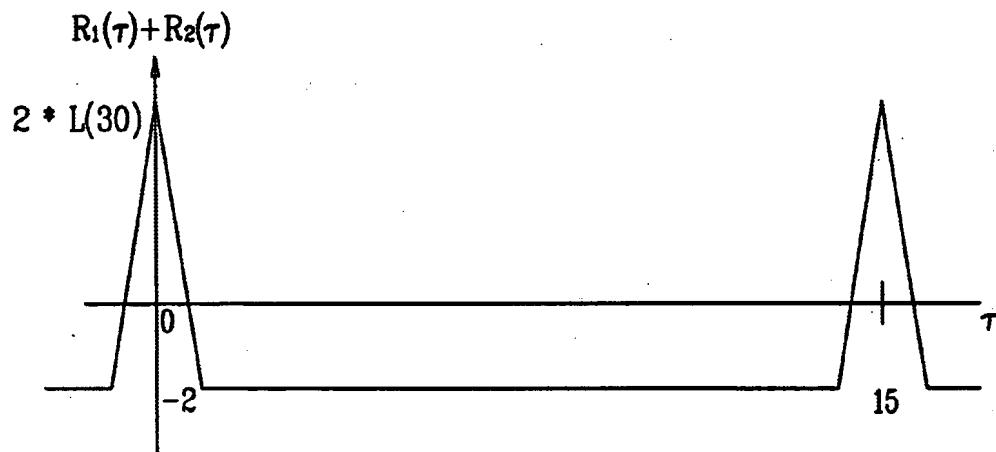


FIG. 22B

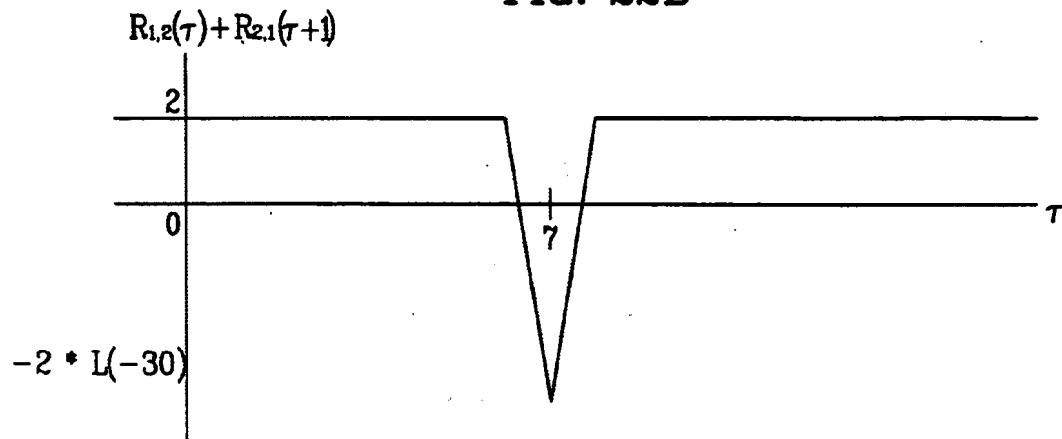




FIG. 22C

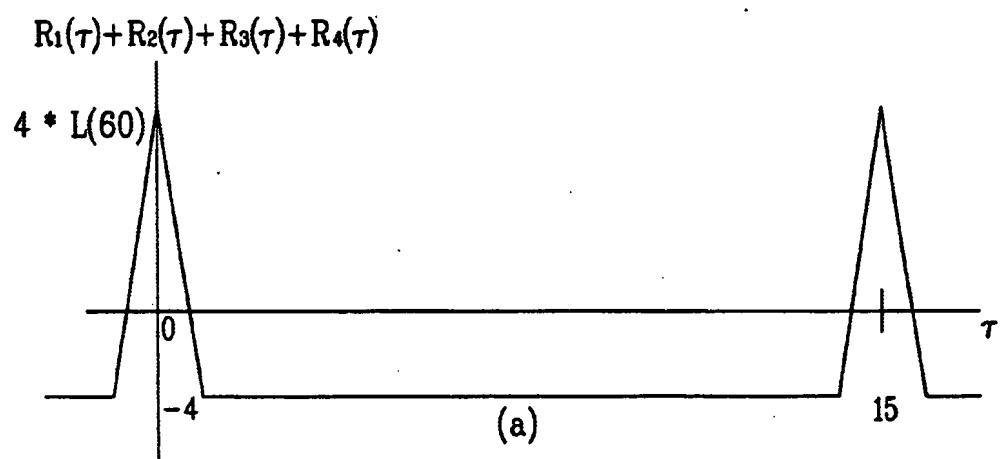
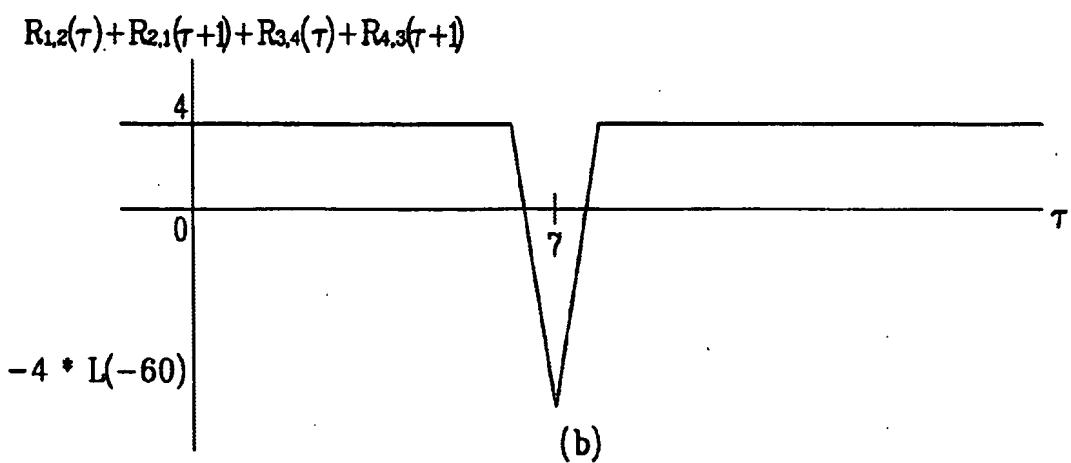


FIG. 22D



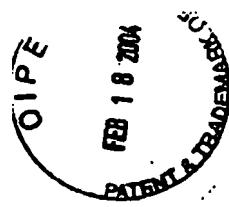


FIG. 23A

Bit #	N _{pilot} = 2		N _{pilot} = 3			N _{pilot} = 4			
	0	1	0	1	2	0	1	2	3
Slot #1	1	1	1	1	1	1	1	1	1
2	0	0	0	1	0	1	0	1	0
3	0	1	0	1	1	1	0	1	1
4	0	0	0	1	0	1	0	1	0
5	1	0	1	1	0	1	1	1	0
6	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1
8	1	0	1	1	0	1	1	1	0
9	0	1	0	1	1	1	0	1	1
10	1	1	1	1	1	1	1	1	1
11	0	1	0	1	1	1	0	1	1
12	1	0	1	1	0	1	1	1	0
13	1	0	1	1	0	1	1	1	0
14	0	0	0	1	0	1	0	1	0
15	0	0	0	1	0	1	0	1	0

FIG. 23B

N _{pilot}	Pilot bit position #	Corresponding word of length 15
2	0	C ₁
	1	C ₂
3	0	C ₁
	2	C ₂
4	1	C ₁
	3	C ₂



FIG. 23C

Bit #	Npilot = 2			Npilot = 3			Npilot = 4		
	0	1	0	1	2	0	1	2	3
Slot #1	1	1	1	1	1	1	1	1	1
2	1	0	0	1	0	1	0	1	0
3	1	1	0	1	1	1	0	1	1
4	1	0	0	1	0	1	0	1	0
5	1	0	1	1	0	1	1	1	0
6	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1
8	1	0	1	1	0	1	1	1	0
9	1	1	0	1	1	1	0	1	1
10	1	1	1	1	1	1	1	1	1
11	1	1	0	1	1	1	0	1	1
12	1	0	1	1	0	1	1	1	0
13	1	0	1	1	0	1	1	1	0
14	1	0	0	1	0	1	0	1	0
15	1	0	0	1	0	1	0	1	0

FIG. 23D

Npilot	Pilot bit position #	Corresponding word of length 15
2	1	C ₁
3	0	C ₁
	2	C ₂
4	1	C ₁
	3	C ₂



FIG. 23E

Bit #	Npilot = 5					Npilot = 6					
	0	1	2	3	4	0	1	2	3	4	5
Slot #1	1	1	1	1	0	1	1	1	1	1	0
2	0	0	1	1	0	1	0	0	1	1	0
3	0	1	1	0	1	1	0	1	1	0	1
4	0	0	1	0	0	1	0	0	1	0	0
5	1	0	1	0	1	1	1	0	1	0	1
6	1	1	1	1	0	1	1	1	1	1	0
7	1	1	1	0	0	1	1	1	1	0	0
8	1	0	1	0	0	1	1	0	1	0	0
9	0	1	1	1	0	1	0	1	1	1	0
10	1	1	1	1	1	1	1	1	1	1	1
11	0	1	1	0	1	1	0	1	1	0	1
12	1	0	1	1	1	1	1	0	1	1	1
13	1	0	1	0	0	1	1	0	1	0	0
14	0	0	1	1	1	1	0	0	1	1	1
15	0	0	1	1	1	1	0	0	1	1	1

FIG. 23F

Bit #	Npilot = 7						Npilot = 8							
	0	1	2	3	4	5	6	0	1	2	3	4	5	6
Slot #1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
2	1	0	0	1	1	0	1	1	0	1	0	1	1	0
3	1	0	1	1	0	1	1	1	0	1	1	0	1	1
4	1	0	0	1	0	0	1	1	0	1	0	1	0	1
5	1	1	0	1	0	1	1	1	1	0	1	0	1	1
6	1	1	1	1	1	0	1	1	1	1	1	1	1	0
7	1	1	1	1	0	0	1	1	1	1	1	0	1	0
8	1	1	0	1	0	0	1	1	1	0	1	0	1	0
9	1	0	1	1	1	0	1	1	0	1	1	1	1	0
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	0	1	1	0	1	1	1	0	1	1	1	0	1
12	1	1	0	1	1	1	1	1	1	0	1	1	1	1
13	1	1	0	1	0	0	1	1	1	0	1	0	1	0
14	1	0	0	1	1	1	1	1	0	1	0	1	1	1
15	1	0	0	1	1	1	1	1	0	1	0	1	1	1



FIG. 23G

N _{bit}	Pilot bit position #	Corresponding word of length 15
5	0	C ₁
	1	C ₂
	3	C ₃
	4	C ₄
6	1	C ₁
	2	C ₂
	4	C ₃
	5	C ₄
7	1	C ₁
	2	C ₂
	4	C ₃
	5	C ₄
8	1	C ₁
	3	C ₂
	5	C ₃
	7	C ₄

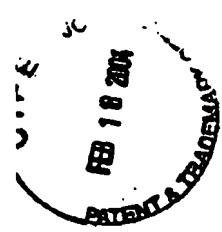


FIG. 23H

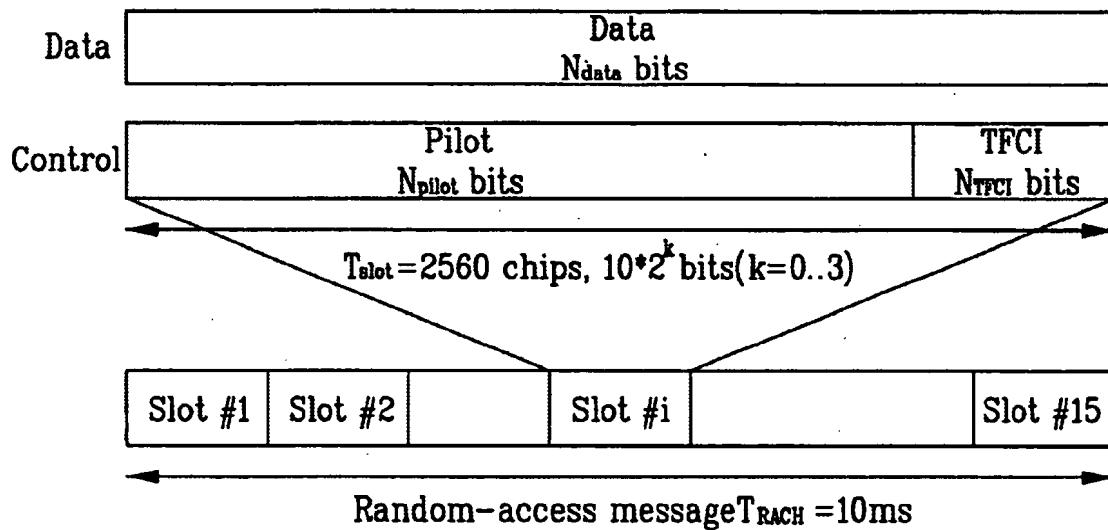


FIG. 23I

Channel Bit Rate(kbps)	Channel Symbol Rate(ksp/s)	SF	Bits/Frame	Bits/Slot	N _{pilot}	N _{TFCI}
15	15	256	150	10	8	2

FIG. 23J

Bit #	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	1	1	0
2	1	0	1	0	1	1	1	0
3	1	0	1	1	1	0	1	1
4	1	0	1	0	1	0	1	0
5	1	1	1	0	1	0	1	1
6	1	1	1	1	1	1	1	0
7	1	1	1	1	1	0	1	0
8	1	1	1	0	1	0	1	0
9	1	0	1	1	1	1	1	0
10	1	1	1	1	1	1	1	1
11	1	0	1	1	1	0	1	1
12	1	1	1	0	1	1	1	1
13	1	1	1	0	1	0	1	0
14	1	0	1	0	1	1	1	1
15	1	0	1	0	1	1	1	1



FIG. 24C

Symbol #	N _{pilot} = 4		N _{pilot} = 8			N _{pilot} = 16								
	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	01	10	11	00	00	10	11	00	00	10	11	00	00	10
2	10	10	11	00	00	01	11	00	00	01	11	10	00	10
3	11	10	11	11	00	00	11	11	00	00	11	10	00	11
4	10	10	11	10	00	01	11	10	00	01	11	00	00	00
5	00	10	11	11	00	11	11	11	00	11	11	01	00	10
6	01	10	11	00	00	10	11	00	00	10	11	11	00	00
7	01	10	11	10	00	10	11	10	00	10	11	01	00	11
8	00	10	11	10	00	11	11	10	00	11	11	10	00	11
9	11	10	11	00	00	00	11	00	00	00	11	01	00	01
10	01	10	11	01	00	10	11	01	00	10	11	01	00	01
11	11	10	11	11	00	00	11	11	00	00	11	00	00	10
12	00	10	11	01	00	11	11	01	00	11	11	00	00	01
13	00	10	11	10	00	11	11	10	00	11	11	11	00	00
14	10	10	11	01	00	01	11	01	00	01	11	10	00	01
15	10	10	11	01	00	01	11	01	00	01	11	11	00	11

FIG. 24D

Symbol rate	Symbol #	Channel	Corresponding word of length 15
N _{pilot} = 4	0	I-CH	-C ₁
		Q-CH	C ₂
N _{pilot} = 8	1	I-CH	-C ₃
		Q-CH	C ₄
N _{pilot} = 16	3	I-CH	C ₁
		Q-CH	-C ₂
	1	I-CH	-C ₃
		Q-CH	C ₄
	3	I-CH	C ₁
		Q-CH	-C ₂
	5	I-CH	-C ₇
		Q-CH	C ₈
	7	I-CH	C ₆
		Q-CH	-C ₈



FIG. 25A

Symbol #	N _{pilot} = 8				N _{pilot} = 16							
	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	10	11	11	11	10	11	11	11	10
2	11	00	11	10	11	00	11	10	11	11	11	00
3	11	01	11	01	11	01	11	01	11	10	11	00
4	11	00	11	00	11	00	11	00	11	01	11	10
5	11	10	11	01	11	10	11	01	11	11	11	11
6	11	11	11	10	11	11	11	10	11	01	11	01
7	11	11	11	00	11	11	11	00	11	10	11	11
8	11	10	11	00	11	10	11	00	11	10	11	00
9	11	01	11	10	11	01	11	10	11	00	11	11
10	11	11	11	11	11	11	11	11	11	00	11	11
11	11	01	11	01	11	01	11	01	11	11	11	10
12	11	10	11	11	11	10	11	11	11	00	11	10
13	11	10	11	00	11	10	11	00	11	01	11	01
14	11	00	11	11	11	00	11	11	11	00	11	00
15	11	00	11	11	11	00	11	11	11	10	11	01

FIG. 25B

Symbol rate	Symbol #	Channel	Corresponding word of length 15
N _{pilot} = 8	1	I-CH	C ₁
		Q-CH	C ₂
	3	I-CH	C ₃
		Q-CH	C ₄
N _{pilot} = 16	1	I-CH	C ₁
		Q-CH	C ₂
	3	I-CH	C ₃
		Q-CH	C ₄
	5	I-CH	C ₅
		Q-CH	C ₆
	7	I-CH	C ₇
		Q-CH	C ₈



FIG. 25C

Symbol #	N _{pilot} = 8				N _{pilot} = 16							
	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	00	00	10	11	00	00	10	11	00	00	10
2	11	00	00	01	11	00	00	01	11	10	00	10
3	11	11	00	00	11	11	00	00	11	10	00	11
4	11	10	00	01	11	10	00	01	11	00	00	00
5	11	11	00	11	11	11	00	11	11	01	00	10
6	11	00	00	10	11	00	00	10	11	11	00	00
7	11	10	00	10	11	10	00	10	11	01	00	11
8	11	10	00	11	11	10	00	11	11	10	00	11
9	11	00	00	00	11	00	00	00	11	01	00	01
10	11	01	00	10	11	01	00	10	11	01	00	01
11	11	11	00	00	11	11	00	00	11	00	00	10
12	11	01	00	11	11	01	00	11	11	00	00	01
13	11	10	00	11	11	10	00	11	11	11	00	00
14	11	01	00	01	11	01	00	01	11	10	00	01
15	11	01	00	01	11	01	00	01	11	11	00	11

FIG. 25D

Symbol rate	Symbol #	Channel	Corresponding word of length 15
N _{pilot} = 8	1	I-CH	-C ₃
		Q-CH	C ₄
	3	I-CH	C ₁
		Q-CH	C ₂
N _{pilot} = 16	1	I-CH	-C ₃
		Q-CH	C ₄
	3	I-CH	C ₁
		Q-CH	-C ₂
	5	I-CH	-C ₇
		Q-CH	C ₈
	7	I-CH	C ₅
		Q-CH	-C ₆

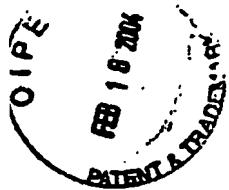


FIG. 26A

Parameters	Uplink
Number of slots per frame	15
Number of bits in the DPCCH(Pilot/TPC/TFCI/FBI)	6/2/2/0
Number of bits in the DPDCH per each slot	10
Spreading factor (DPDCH)	256
Spreading factor (DPCCH)	256
Modulation	HPSK
3dB bandwidth	3.84MHz
Shaping filter	Root raised cosine (roll off 0.22)
Power amplifier	Ideal
Propagation channel	AWGN

FIG. 26B

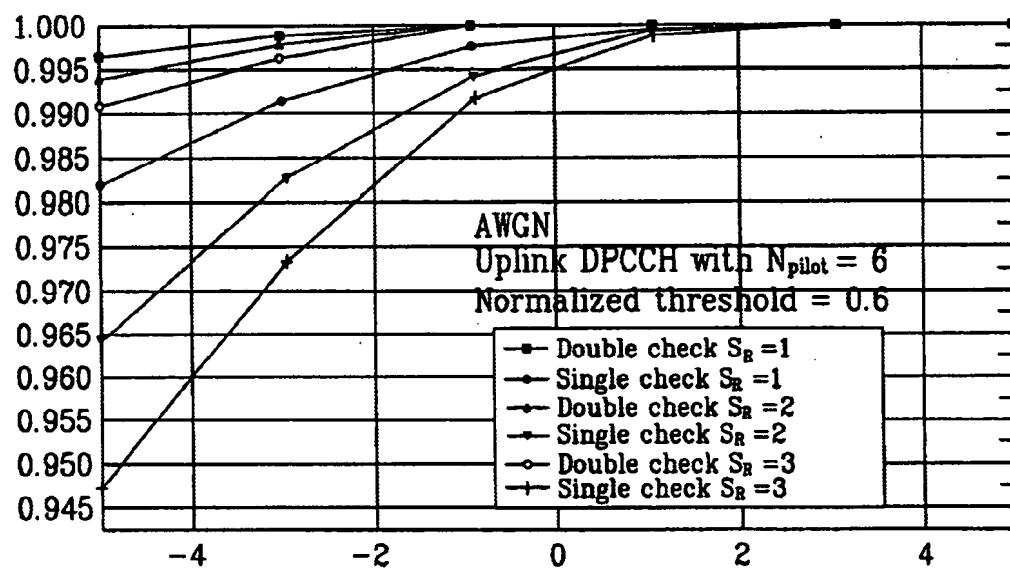




FIG. 26C

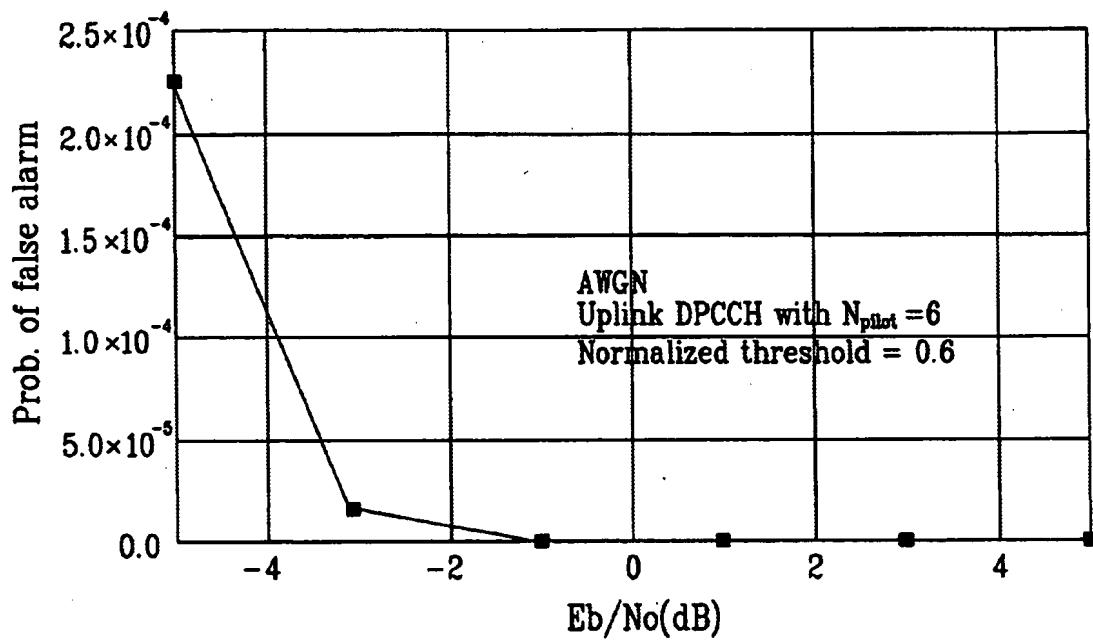


FIG. 27

Item	16 slots	16 slots
No. of slots per frame	15	16
No. of N_{ps} per slot	1) Uplink 2,3,4,5,6,7,8 2) Downlink 2,4,8,16 4,8,16,32	1) Uplink 5,6,7,8 2) Downlink 4,8,16,32
Slot-Slot possible?	Yes	Yes
Double-check possible?	Yes (Two correlators such as auto-correlator and cross-correlator are used)	Yes (Auto-correlator)
Single frame synchronization word can be used for frame synchronization?	Yes since a frame synchronization word has -1 out of -phase coefficients	May not be feasible because of +4 or -4 out-of-phase coefficients. The +4 or -4 side lobes can be zero through some particular processing using preferred pair of frame synchronization words.
Frame synchronization words	All 8 frame synchronization words are made out of a single PN code	All 8 frame synchronization words have +4 or -4 out-of-phase coefficient and minus peak value at middle shift
Autocorrelation function	$R(\tau)=15, \tau=0$ $R(\tau)=-1, \text{ elsewhere}$	$R(\tau)=16, \tau=0$ $R(\tau)=-16, \tau=8$ $R(\tau)=0+4, \text{ or } -4, \text{ elsewhere}$

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FIG. 24A

Symbol #	Npilot = 2		Npilot = 4		Npilot = 8			Npilot = 16						
	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11 11	11	11	11	10	11	11	11	10	11	11	11	10
2	00	11 00	11	00	11	10	11	00	11	10	11	11	11	00
3	01	11 01	11	01	11	01	11	01	11	01	11	10	11	00
4	00	11 00	11	00	11	00	11	00	11	00	11	01	11	10
5	10	11 10	11	10	11	01	11	10	11	01	11	11	11	11
6	11	11 11	11	11	11	10	11	11	11	10	11	01	11	01
7	11	11 11	11	11	11	00	11	11	11	00	11	10	11	11
8	10	11 10	11	10	11	00	11	10	11	00	11	10	11	00
9	01	11 01	11	01	11	10	11	01	11	10	11	00	11	11
10	11	11 11	11	11	11	11	11	11	11	11	11	00	11	11
11	01	11 01	11	01	11	01	11	01	11	01	11	11	11	10
12	10	11 10	11	10	11	11	11	10	11	11	11	00	11	10
13	10	11 10	11	10	11	00	11	10	11	00	11	01	11	01
14	00	11 00	11	00	11	11	11	00	11	11	11	00	11	00
15	00	11 00	11	00	11	11	11	00	11	11	11	10	11	01

FIG. 24B

Symbol rate	Symbol	Channel	Corresponding word of length 15
Npilot = 2	0	I-CH	C ₁
		Q-CH	C ₂
Npilot = 4	1	I-CH	C ₁
		Q-CH	C ₂
Npilot = 8	1	I-CH	C ₁
		Q-CH	C ₂
	3	I-CH	C ₃
		Q-CH	C ₄
Npilot = 16	1	I-CH	C ₁
		Q-CH	C ₂
	3	I-CH	C ₃
		Q-CH	C ₄
	5	I-CH	C ₅
		Q-CH	C ₆
	7	I-CH	C ₇
		Q-CH	C ₈